



Product Summary

The RuggedMC™ is an industrially hardened fiber optical media converter specifically designed to operate in harsh environments such as those found in electric utility substations and factory floors. The RuggedMC™ provides industrial strength Ethernet copper-to-fiber media conversion allowing for 10BaseT-to-10BaseFL and 100BaseTX-to-100BaseFX over SingleMode or MultiMode fiber optics.

The RuggedMC™ is specifically designed to meet the same EMI immunity and environmental requirements as mission critical protective relaying devices in accordance with the newly issued IEC 61850-3 (2002) and IEEE 1613 (2003) standards for communications and networking equipment in electric power utility substations as well as NEMA TS 2 (1998) EMI and environmental requirements for traffic control equipment. The reliability of the RuggedCom product families exceeds those of commercial devices by having no rotating mechanical parts (i.e. no cooling fans), utilizing high-temperature solid state components and incorporating the necessary transient and surge suppression circuitry required for substation and electrically harsh environments.

Features and Benefits

Universal Power Supply Options

- 24VDC, 48VDC or HI (88-300VDC / 85 - 264VAC) options for worldwide operability
- Integrated high-reliability power supply eliminates the need for external power transformer
- Screw down terminal blocks ensure reliable maintenance-free connections
- All power supplies CSA/UL 60950 approved for +85°C (+185°F) operation
- Meets NEMA TS 2 (1998) Environmental Requirements for traffic control equipment.

Designed for Harsh Environments

- Exceeds IEC 61850-3 and IEEE 1613 Standards for communication equipment in electric power substations.
- Operates over a temperature range of -40°C to +85°C without the use of fans for improved reliability
- 18 AWG galvanized steel enclosure suitable for DIN or panel mounting provide secure mechanical reliability

Simple Plug and Play Operation

- Simple, externally-accessible configuration
- Transmit and receive data LED indicators for quick and easy troubleshooting
- Fully integrated power supply connects directly to power source permanently for reliable maintenance-free operation

Key Features

- 10BaseT to 10BaseFL, MM (820nm) via ST Connectors, 2km
- 10BaseT to 10BaseFL, SM (1310nm) via ST Connectors, 15km
- 100BaseTX to 100BaseFX, MM (1300nm) via SFF MTRJ Connector, 2km
- 100BaseTX to 100BaseFX, SM (1310nm) via SFF LC Connector, 15km
- IEEE 802.3 (Ethernet) and IEEE 802.3u (Fast Ethernet) compliant
- Full Duplex and Half Duplex Operation (Configurable).
- Fiber Negotiation Mode Switch to support FDX, HDX or Auto-negotiation on fiber port
- Link Pass Through support
- Switch on faceplate for Uplink Configuration (Pass Through or Cross Over)
- Power Input via 3 position screw terminal on baseplate

RUGGEDCOM
ISO 9001:2000
CERTIFIED

EMI and Environmental Type Tests

IEC 61850-3 EMI TYPE TESTS				
TEST	Description		Test Levels	Severity Levels
IEC 61000-4-2	ESD	Enclosure Contact	+/- 8kV	4
		Enclosure Air	+/- 15kV	4
IEC 61000-4-3	Radiated RFI	Enclosure ports	20 V/m	x
IEC 61000-4-4	Burst (Fast Transient)	Signal ports	+/- 4kV @ 2.5kHz	x
		D.C. Power ports	+/- 4kV	4
		A.C. Power ports	+/- 4kV	4
		Earth ground ports ³	+/- 4kV	4
IEC 61000-4-5	Surge	Signal ports	+/- 4kV line-to-earth, +/- 2kV line-to-line	4
		D.C. Power ports	+/- 2kV line-to-earth, +/- 1kV line-to-line	3
		A.C. Power ports	+/- 4kV line-to-earth, +/- 2kV line-to-line	4
IEC 61000-4-6	Induced (Conducted) RFI	Signal ports	10V	3
		D.C Power ports	10V	3
		A.C. Power ports	10V	3
		Earth ground ports ³	10V	3
IEC 61000-4-8	Magnetic Field	Enclosure ports	40 A/m continuous, 1000 A/m for 1 s	N/A
IEC 61000-4-29	Voltage Dips & Interrupts	D.C. Power ports	30% for 0.1s, 60% for 0.1s, 100% for 0.05s	N/A
IEC 61000-4-11		A.C. Power ports	30% for 1 period, 60% for 50 periods	N/A
IEC 61000-4-12	Damped Oscillatory	Signal ports	2.5kV common, 1kV diff. mode@1MHz	3
		D.C. Power ports	2.5kV common, 1kV diff. mode@1MHz	3
		A.C. Power ports	2.5kV common, 1kV diff. mode@1MHz	3
IEC 61000-4-16	Mains Frequency Voltage	Signal ports	30V Continuous, 300V for 1s	4
IEC 61000-4-17	Ripple on D.C. Power Supply	D.C. Power ports	30V Continuous, 300V for 1s	4
IEC 60255-5	Dielectric Strength	D.C. Power ports	10%	3
		Signal ports	2kVac (Fail-Safe Relay output)	N/A
		D.C. Power ports	2kVac	N/A
IEC 60255-5	H.V. Impulse	A.C. Power ports	2kVac	N/A
		Signal ports	5kV (Fail-Safe Relay output)	N/A
		D.C. Power ports	5kV	N/A
		A.C. Power ports	5kV	N/A

IEEE 1613 (C37.90.x) EMI IMMUNITY TYPE TESTS				
Test	Description		Test Levels	Severity Levels
IEEE C37.90.3	ESD	Enclosure Contact	+/- 8kV	N/A
		Enclosure Air	+/- 15kV	N/A
IEEE C37.90.2	Radiated RFI	Enclosure ports	35 V/m	N/A
IEEE C37.90.1	Fast Transient	Signal ports	+/- 4kV @ 2.5kHz	N/A
		D.C. Power ports	+/- 4kV	N/A
		A.C. Power ports	+/- 4kV	N/A
		Earth ground ports ³	+/- 4kV	N/A
IEEE C37.90.1	Oscillatory	Signal ports	2.5kV common mode @1MHz	N/A
		D.C. Power ports	2.5kV common, 1kV diff. mode@1MHz	N/A
		A.C. Power ports	2.5kV common, 1kV diff. mode@1MHz	N/A
IEEE C37.90	H.V. Impulse	Signal ports	5kV (Fail-Safe Relay output)	N/A
		D.C. Power ports	5kV	N/A
		A.C. Power ports	5kV	N/A
IEEE C37.90	Dielectric Strength	Signal ports	2kVac	N/A
		D.C. Power ports	2kVac	N/A
		A.C. Power ports	2kVac	N/A

Environmental Type Tests				
Test	Description		Test Levels	Severity Levels
IEC 60068-2-1	Cold Temperature	Test Ad	-40°C, 16 Hours	N/A
IEC 60068-2-2	Dry Heat	Test Bd	+85°C, 16 Hours	N/A
IEC 60068-2-30	Humidity (Damp Heat, Cyclic)	Test Db	95% (non-condensing), 55°C , 6 cycles	N/A
IEC 60255-21-1	Vibration	Tests Fc	2g @ (10 - 150) Hz	Class 2
IEC 60255-21-2	Shock	Tests Ea	30g @ 11mS	Class 2

Notes:

1. Only applicable to functional earth connections separated from the safety earth connection.
2. Class 2 refers to "Measuring relays and protection equipment for which a very high security margin is required or where the vibration levels are very high, (e.g. shipboard application and for severe transportation conditions")

Technical Specifications

Power Supply

- Power Consumption: 5W (max)
- 24VDC: 10-36VDC (max)
- 48VDC: 36-59VDC (max)
- HI Voltage AC/DC: 88-300VDC, 85-265VAC (max)

Physical Dimensions

- Height: 3.86"
- Width: 2.07"
- Depth: 3.55"
- Weight: 1.5lbs (0.68kg)
- Enclosure: 18 AWG galvanized steel enclosure
- Mounting: DIN rail or panel mounted

EMI Immunity and Environmental Compliance

- IEC 61000-6-2 Industrial (Generic)
- IEC 61800-3 Industrial (Variable Speed Drive Systems)
- IEC 61850-3 Electric Utility Substations
- IEEE 1613 Electric Utility Substations
- NEMA TS 2 Traffic Control Equipment

IEEE Compliance

- 802.3-10BaseT
- 802.3u-100BaseTX, 100BaseFX

Approvals

- ISO: Designed and manufactured using a ISO9001: 2000 certified quality program
- CE Marking
- Emissions: FCC Part 15 (Class A), EN55022 (CISPR22 Class A)
- Safety: cCSAus (Compliant with CSA C22.2 No. 60950, UL 60950, EN60950)
- Laser Eye Safety (FDA/CDRH): Complies with 21 CFR Chapter1, Subchapter J.

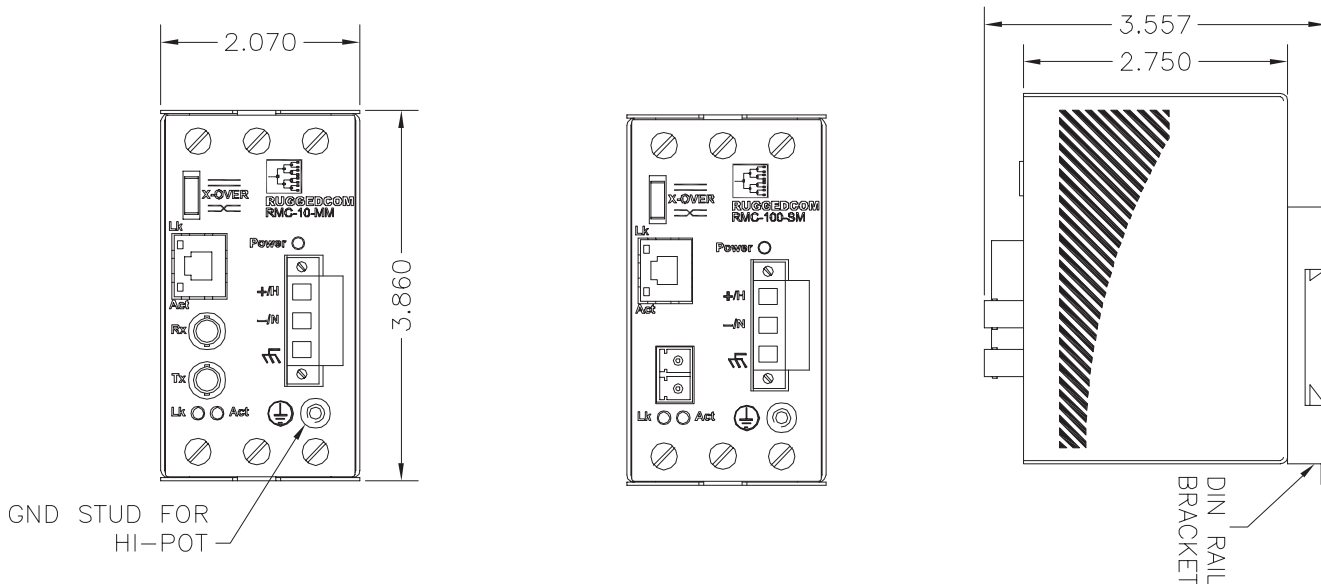
Warranty

- 5 Years-Applicable to design or manufacturing related product defects.

Fiber Optical Specifications				
Parameter	Fiber Port Type			
	10BaseFL		100BaseFX	
Speed				
Mode	Multimode	Singlemode	Multimode	Singlemode
Connectors	ST		MTRJ	LC
Typical Dist. (km)	2	15	2	15
Optical Wavelength (nm)	820	1310	1300	1310
Cable Size Core/Cladding (um)	62.5/125	-9/125	62.5/125	-9/125
Tx Power (dBm)	-13.5/-7.6	-23/-15	-16/-11	-15/-8
Rx Sensitivity (dBm)	-34.4	-38	-33.5	-31
Typical Budget	22	18	17	16.5

Longer segment lengths dependent on fiber specifications. Consult factory for further details.

Dimensions



Order Codes

Order Codes

RMC - -
 PS - CT

PS: Power Supply

- 24 = 24VDC (18-36VDC)
- 48 = 48VDC (36-59VDC)
- HI = 88-300VDC or 85-264VAC

CT: Conversion Type

- TFLMM = 10BaseT to 10FL MM, 820nm,
2km via ST connectors
- TFLSM = 10BaseT to 10FL SM, 1310nm,
2km via SFF ST connector
- TXFXMM = 100BaseTX to 100FX MM, 1300nm,
2km via SFF MTRJ connector
- TXFXSM = 100BaseTX to 100FX SM, 1310nm,
15km via SFF LC connector

Valid Order Code Examples

- RMC-HI-TFLMM
- RMC-HI-TFLSM
- RMC-48-TXFXSM

*MM=MultiMode

*SM=SingleMode

Mounting Options

- DIN rail mounting is standard
- For Panel mounting, order P/N 41-12-006

For additional information on our products and services, please visit our website at:
www.ruggedcom.com

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Patent Pending
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